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THE U.S. TRANSPORTATION NETWORK - IS IT "MOBILIZEABLE"?

BY

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16 APRIL 1982

US ARMY WAR COLLEGE, CARLISLE BARRACKS, PENNSYLVANIA

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A thorough analysis and assessment of US transportatin capability to support mobilization. Every mode is analyzed from standpoint of trends, advantages/disadvantages of the mode, and limitations impacting on mobilization. The trends and pitfalls of transportation management are also discussed. Essay is thorough and readable.

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US ARMY WAR COLLEGE

INDIVIDUAL RESEARCH BASED ESSAY

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LIEUTENANT COLONEL DAVE DEANER

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INTRODUCTION

This oft repeated question has been confronting logistic planners for many years and will continue to plague them for years to come. In 1959, the Subcommittee of the Committee on Armed Services of the House of Representatives asked the very same question. Some of their conclusions were:

1. Without the complete transportation requirements of essential civilian and war-supporting industries, it is difficult, if not impossible, to reach an irrefutable conclusion as to the adequacy or inadequacy of the transportation systems. As we have indicated, the military has computed its requirements under certain hypothetical cases. It is reasonable to believe that the Office of Civil and Defense Mobilization (OCDM) utilizing these same situations, could compute the remaining requirements. Thereafter, these could be compared alongside the capabilities of each mode as reported by them and a total picture obtained.

2. The discontinuance of such nonessential industry and travel will release for essential use sufficient overall transportation capability to probably support the national defense effort in the event of mobilization, if the emergency is not of long duration.

3. Despite the probable adequacy of overall capability, it has been determined that in certain selected types of transportation, according to the hypothetical situations envisioned by the military,

there may be shortages due to the lack of sufficient specialized equipment.

4. There was demonstrated in these hearings an obvious urgent need for a National Traffic Control System, in being, staffed by officials in Government and in the transportation industry, who will work together and be ready to operate in time of emergency on a national and regional level. The Military Traffic Management Agency advised that it has the machinery for such an organization in the realm of its responsibility and that it has been tested. The OCDM has such a plan in its executive reserve but this plan, on a national and regional level, has not been fully implemented or tested. It is the recommendation of this committee that a National Traffic Control System be established on a civilian level, that it be implemented on a permanent basis by the OCDM, tested and in a position to be augmented by its executive reserve plan in event of an emergency.

Some 20 years later, the answer to this broad and provocative question cannot be given with any higher degree of certainty than it was then. Various reasons exist to support such a statement. Perhaps the two that best describe this uncertainty when referring to the U.S. transportation network are the phrases "incredible complexity" and "enormous diversity".

The network encompasses a broad array of transportation modes. Most people tend to think of the system as only being comprised of rail, highway and air. In actuality, it is much more diverse than that. As defined in this paper, the network consists of two segments: (1) elements within the Continental United States (CONUS); and (2) airlift and sealift capability from CONUS to overseas areas. Within CONUS, the various transportation modes to be discussed include: (1) highways; (2) inland waterways; (3) railroads; and (4) pipelines.

Other factors also add to the difficulty in providing answers to this central question. The most significant ones include: (1) physical assets of system (in terms of quantity and physical condition); (2) length of conflict (including warning time); (3) type of conflict (resolve of U.S. position); (4) location of conflict (scenario-dependent); and (5) cohesiveness and effectiveness of network's overall management structure.

The only two factors reasonably quantifiable are (1) and (5). Information exists on these two factors which enables one to make an assessment of the total system's capabilities in the event of mobilization. Much of the discussion therefore, will be oriented toward the network's physical assets and its management structure. The remaining factors are not predictable and ultimately depend on events which transpire outside the realm of the network. Even so, they cannot however, be merely dismissed and must at least be addressed in a qualitative fashion since they ultimately exert a comparable influence on the answer as do physical assets and management structure of the network.

The length of any future conflict will have a marked impact on the surge capability of the U.S. transportation network. Current thought on this aspect is for a short duration war of less than six weeks with a minimum warning time of between 10 and 20 days. These times are totally foreign to conventional thinking when compared to the preparation and conflict times in previous wars that the U.S. was involved in.

In a future conflict, not only will response times be more contracted, but stress on the transportation network will also increase due to demands for rapid resupply in short time frames. Accordingly, there can be little margin for error in this type of setting. Either the system must respond to short suspenses with a capability to haul huge quantities of war materials or the deployability and sustainability of U.S. forces simply will not occur.

The type of future conflict (limited or full-scale) and the strength of resolve of the U.S. position will exert a tremendous impact on the surge capability of the network. The history of U.S. involvement in World Wars I and II where U.S. commitment was both extensive and unified resulted in the transportation network being able to respond to the demands of those conflicts. History also records that in those conflicts where U.S. resolve was weak and divisive because of a lack of national will, the network responded with lesser diligence.

This factor not only applies to the transportation network but also is applicable to the surge capability generated by the U.S. industrial base. Table 1 indicates the types and amounts of weapons systems that the base produced for the war effort during the 1941-1945 time frame.

TABLE 1

Weapon Systems that the U.S. Industrial Base produced for World War II (1941 - 1945)

310,000	Aircraft
88,000	Tanks
10	Battleships
358	Destroyers
211	Submarines
27	Aircraft Carriers
900,000	Trucks & Motorized Weapon Carriers

NOTES: 1. Liberty ships were being built in 50 days.
2. 9,117 military aircraft were built in March, 1944.

Another striking example of the network's capacity to respond in times of crisis is that of the airlift of U.S. weapons and materials to Israel during the 1973 Yom Kippur War. In his memoirs on the war, Henry Kissinger stated that:

> Our airlift, meanwhile, was proceeding in stunning fashion. Once over its second thoughts, our Defense Department put on the sort of performance no other country can match, carrying an average of about 50 tons of equipment each hour over a distance of 6,000 miles. In the first full day of the airlift, we had more than matched what the Soviet Union had put into Egypt, Syria and Iraq combined in all of the four previous days.

This intangible is often overlooked but often is the one that ultimately determines the outcome of the conflict.

Another factor impacting on transportation capability is the length of the conflict. Conditions in today's international arena are materially different from those that existed at the time of World War II. Strategic mobility was viewed in a different context than it is thought of today. Coupled with this difference was the fact that U.S. involvement only occurred in two theaters, viz., Europe and the Far East. Today's environment is worldwide covering virtually all areas of the globe. U.S. presence and its ability to project power into any region of the world has placed an intense demand on the strategic mobility assets of the transportation network. The possible scenarios of the 1980s are complex and multi-dimensional when compared to the two theater scenarios of the 1940s. The combinations which might occur present the logistician with a myriad of transportation requirements.

It is not only conceivable but entirely probable that the U.S. will have to project power in two directions at the same time, viz., NATO and Southwest Asia. This multi-directional approach is part of current U.S.

policy of preparing to fight "one and one-half wars" simultaneously. When tested however, recent lessons learned from Mobex '78 (Nifty Nugget) and Mobex '80 (Proud Spirit) concluded that current U.S. strategic transportation resources were insufficent and that U.S. forces in Europe could not be sustained. They further concluded that resources to support the "one and one-half" scenario at this time are impossible.

HIGHWAYS AND THE TRUCKING NETWORK

The U.S. is indeed fortunate to have an excellent network of roads connecting virtually all segments of the nation. It has more miles of roads and more trucks than any other nation in the world. During the past two decades, the trucking industry which utilizes the network extensively, has managed to gain a significant inroad into the hauling business once monopolized by the rail industry and in fact today enjoys a lead over the rail industry in hauling most of the nation's cargo.

In times of crisis, the road network and the trucking industry will be called upon to provide strategic mobility as part of the total mobilization effort. For example, if a conflict occurred in the NATO theater, it would require about 2 1/2 million short tons of supplies to be delivered during the first 30 days. Concurrently, some 5,000 military reserve units from various states would also be moving from their home stations to ports of embarkation. This is in addition to the movement of active duty forces.

Many years ago, Congress recognized the importance of this mode in the national defense picture and allocated funds to construct a road network called the National System of Interstate and Defense Highways (NSIDH). Of the approximately 42,500 miles on the network, 95% is presently completed. Recently, the U.S. Army's Military Traffic

Management Command (MTMC) completed a determination of those roads that were deemed vital to the national defense effort. They concluded that in addition to the NSIDH, there are important roads that feed into the NSIDH. These feeder roads comprise about 12,000 miles. The total integrated system comprises what is called the Strategic Highway Corridor Network (STRAHNET) and is shown in Figure 1. This network serves about 95% of the nation's major military installations.

Since many parts of this system are approaching or exceeding their 20 year design life, several problems are now being encountered. The problems are generally widespread and must be attended to in order to keep the system in good condition. Some of these are:

1. Deteriorated and substandard bridges will have to be replaced (72% of all bridges were built before 1935). During the 7 year life of this federal replacement program, only about 5% of the estimated 105,000 deficient bridges have been replaced. Fortunately, only a few of these are found on the STRAHNET and these have been identified.

2. Overhead clearances on bridges will have to be increased from 14 to 16 feet to allow for certain weapon systems to pass underneath them (see Figure 2 for structures with substandard clearances).

3. Pavement surfaces in certain areas are beginning to deteriorate due to extensive usage and overweight loads.

However, when all factors are considered, the STRAHNET is in adequate condition to support a mobilization.

The nation's trucking industry will also have little trouble responding to a mobilization with respect to its physical assets. Currently, there are about 1.3 million freight hauling rigs in this country. Of these, about one-third are not operating due to the current economic climate. The industry is characterized by high decentralization with many firms consisting of one or two trucks called

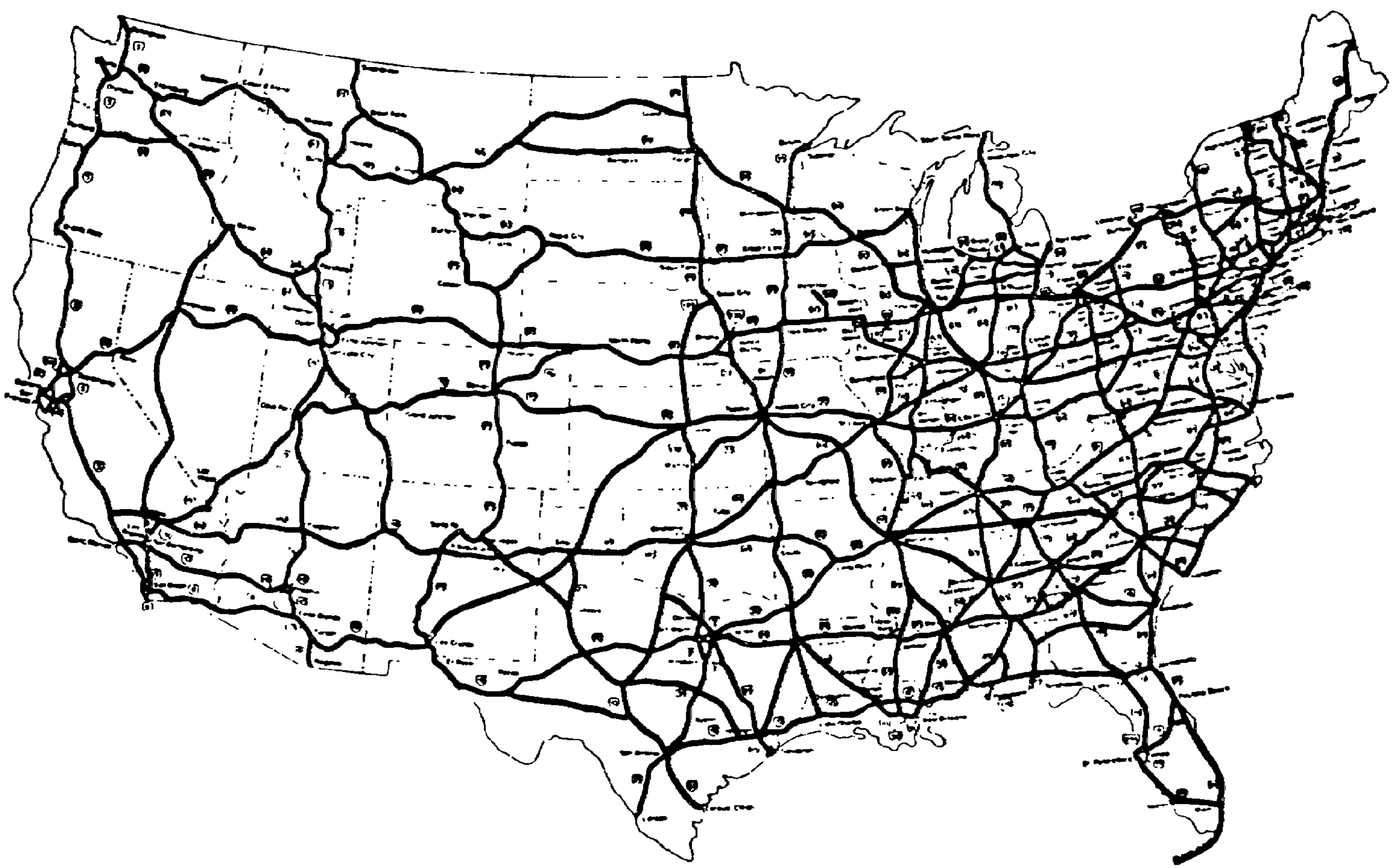


Figure 1. Strategic Highway Corridor Network.

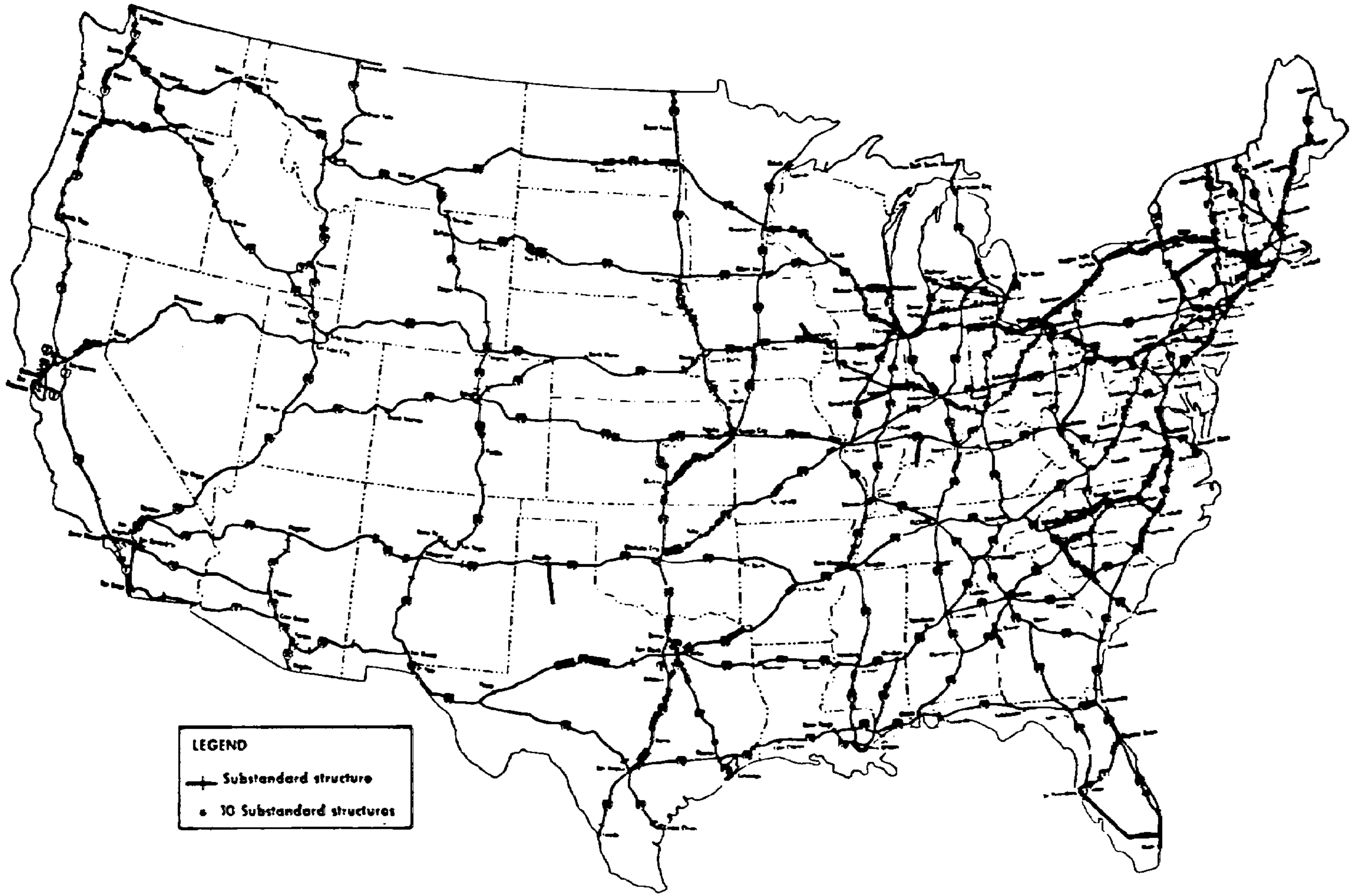


Figure 2. NSIDH structures with substandard vertical clearance.

the "mom and pop enterprise". Because of this, keeping a centralized accounting record of all the industries is extremely difficult. The large haulers maintain an accurate record of their assets but this does not represent industry-wide practice. In the event of mobilization, this lack of centralized accounting will be a serious problem.

Other problems within the industry also would affect the surge potential in the event of mobilization. The most significant one is management. In addition to the lack of centralized accounting already mentioned, two other management issues also exist. No Federal Transportation Command Center exists to assume overall responsibility for truck mobilization and secondly while the larger firms have implemented automated management systems, there is virtually no compatibility between the various software systems, and therefore no interoperability even among the largest companies.

In addition to management problems, other shortfalls exist within the industry. The most critical one is the serious shortage of qualified diesel mechanics whose numbers have been reduced by the current economic situation. The other problem is the availability of fuel. Most large firms stock sufficient fuel for about three days of operations. The remaining firms depend on fuel provided to them from truck stops. Currently, no plan for fuel allocation to these locations during mobilization is in existence.

Despite these shortcomings, physical assets could probably be marshalled during a crisis. The central problem will be in managing these assets to allow for a unified and rapid response.

CONUS INLAND WATERWAY NETWORK

In the event of mobilization, internal waterways would transport some percentage of military cargo to ports. Historically, however, this system has mainly been utilized to carry cargo for private industry. The term inland waterways is defined as including those navigable rivers and canals with depths of nine feet or more and interbay and intracoastal waters capable of supporting Department of Defense (DOD) cargo movements. This depth has been chosen as limiting since depths of less than nine feet are not capable of supporting fully loaded SEABEE and LASH barges and the majority of normal commercial barge traffic.

Currently, there are over 25,000 miles of waterways within the U.S. Of these, about, 16,000 have depths of nine feet or more. Figure 3 indicates the locations of these waterways. The system is primarily composed of five major systems: (1) the Pacific Coast; (2) the New York State Barge Canal; (3) the Great Lakes; (4) the Gulf and Atlantic intracoastal waterways; and (5) the Mississippi River. The navigation season for all these waterways is a full 12 months with several exceptions, viz., the Mississippi and Missouri, the N.Y. State Barge Canal and the Great Lakes during the months of December to March.

Movement along the entire length of the system is provided by towboats or tugboats since all cargo is carried in barges. The capacity of a specific waterway to allow cargo transport is a function of three factors: (1) the availability of the tow or tugboats; (2) the physical condition of the waterway itself; and (3) the capability of the river cargo terminals in loading and unloading operations.

Several other aspects of the system must be considered by planners in utilizing the system. The most important of these are interruption of service, the intermodal transfer of cargo, and the seasonal character of the service as mentioned previously. Interruption of service can be

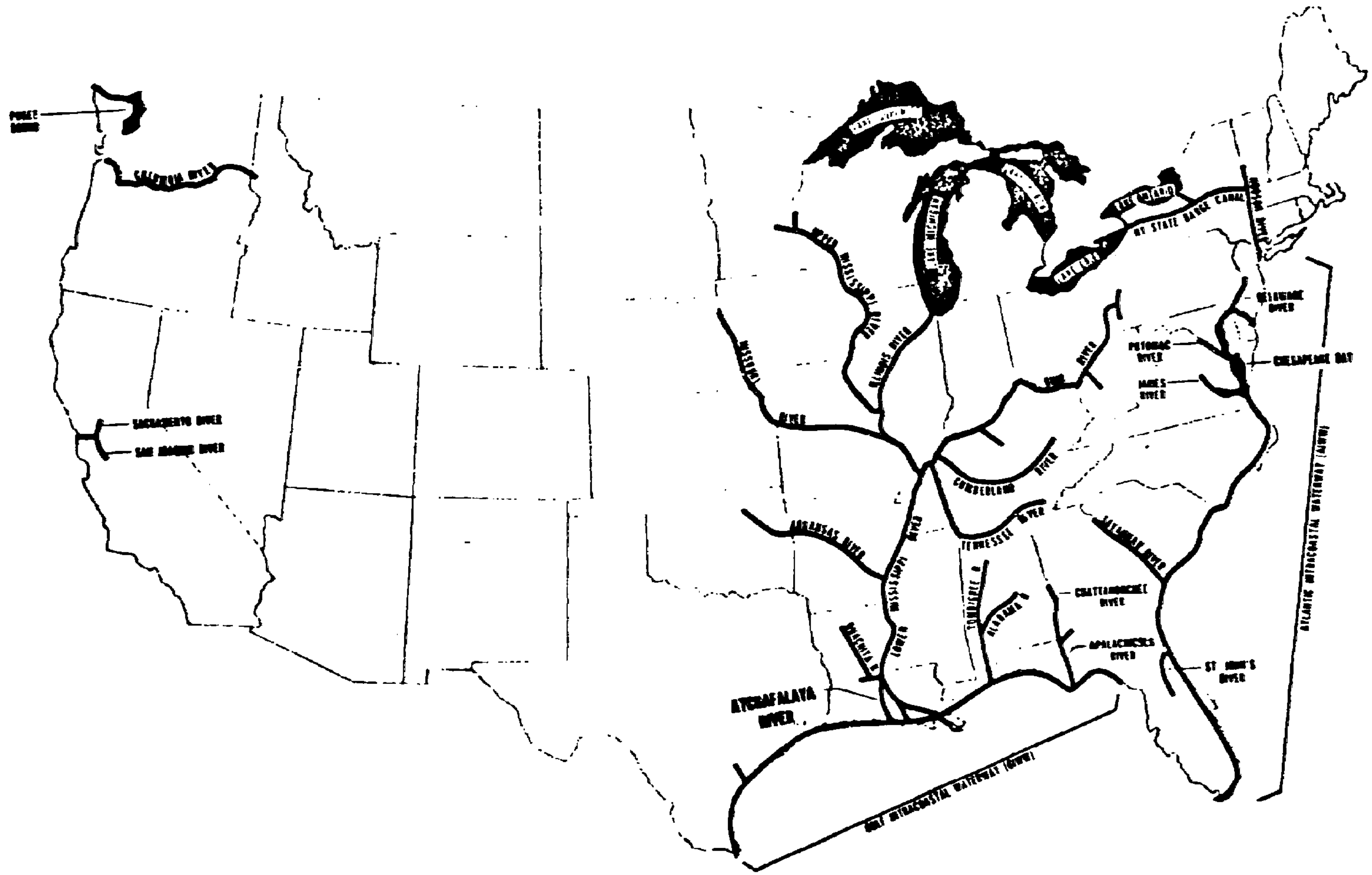


Figure 3. CONUS Waterways with channel depths of 9 feet or more.

caused by natural events such as floods or drought and repair or damage to facilities along the waterways. The intermodal transfer of cargo is important since it translates into additional time and expense in handling. Typically, cargo not originating on the waterway system has to be transferred from truck or rail to the barges and then transferred from the barges to deep-draft ships. Rail and highway services have a distinct advantage over waterways in this regard in that they offer direct service to the ports without any intermediate transfer. Another obvious disadvantage attributable to waterways is its inherent slowness (less than 7 miles per hour).

The major utilization of the network during a mobilization would be in moving large quantities of raw materials essential to support the nation's industrial base. Table 2 indicates the breakdown of DOD cargo moved by the various transportation modes during 1976.

TABLE 2

1976 DOD Cargo Moves, by Mode of Transportation

Tonnage Moved	STON*	Percent
Highway	2,767,403	52.7
Rail	1,793,925	34.1
Inland/Intra-coastal waterway	693,654	13.2
Total	5,254,982	

Note: * - equals short ton which is 2000 pounds.

Table 3 includes a listing of the various types of cargo moved on inland waterways in 1976. From the table, it is apparent that petroleum and Freight of All Kinds (FAK) comprised the highest percentage (97%).

TABLE 3
1976 INTRACOASTAL DOD CARGO MOVEMENTS

Origin	Destination	Tonnage in STON	Commodity
Long Beach, CA	San Diego, CA	30	FAK
Long Beach, CA	Point Mugu, CA	840	FAK
Long Beach, CA	San Nicholas Island, CA	3,360	FAK
San Diego, CA	Long Beach, CA	59	FAK
Bangor, ME	Pease, NH	19	Electrical equipment and parts
Mayport, FL	Norfolk, VA	52	Machinery parts
St. James, LA	Pensacola, FL	5,588	FAK
Revere, MA	Searsport, ME	278	Unidentified
Clifton, NJ	Miami, FL	22	FAK
Davisville, RI	Port Elizabeth, NJ	95	FAK
Charleston, SC	Portsmouth, VA	11	Electrical equipment
Charleston, SC	Beaufort, SC	11,758	FAK
Craney Island, VA	Cherry Point, NC	3,416	Petroleum products
Portsmouth, VA	Mayport, FL	53	Machinery parts
Portsmouth, VA	New London, CT	72	FAK
Corpus Christi, TX	Pasadena, TX	12,861	FAK
Corpus Christi, TX	Lynnhaven, FL	5,000	FAK
Corpus Christi, TX	Pensacola, FL	523	Petroleum products

In 1978, MTMC conducted a determination of the inland waterways which deemed important to national defense. As a result, about 4,000 miles of the network were determined to be important to the national defense effort in times of emergency. Figure 4 indicates those systems on that network.

Summarily then, in regard to the inland waterway system, the following observations can be noted:

1. The network, with few exceptions can be utilized on a yearly basis.

2. The system is primarily oriented to hauling bulk cargo (petroleum).

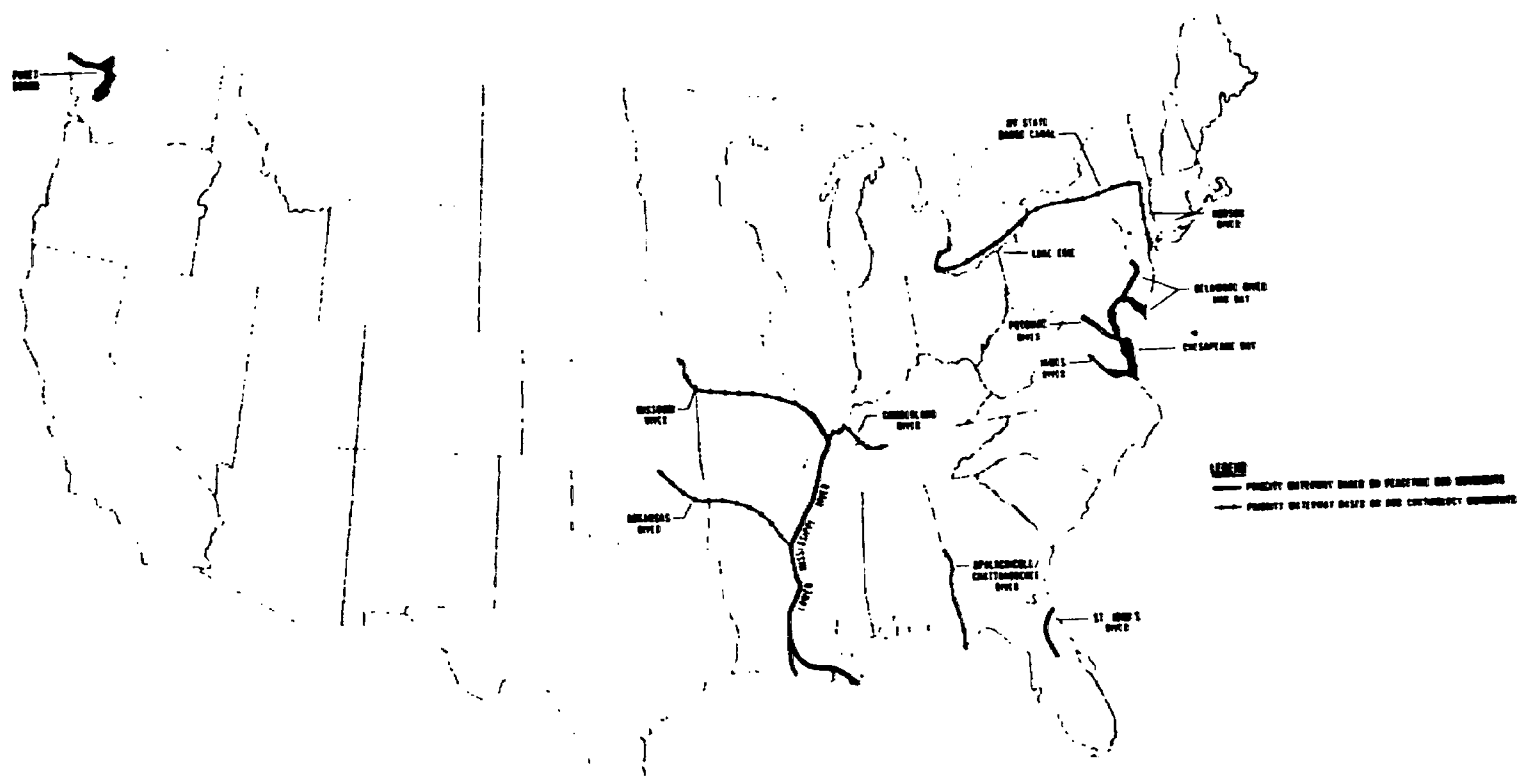


Figure 4 . CONUS inland waterways important to national defense.

3. The natural physical orientation of the system is in a north-south direction while the historic flow of DOD cargo is in an east-west direction. Since highway and railway networks follow an east-west orientation, they enjoy a distinct advantage over the inland waterway network in this regard.

4. The major importance of the system in the event of mobilization would be in moving large quantities of bulk materials in support of the nation's industrial base.

5. The entire system is maintained by the U.S. Army Corps of Engineers and is in good condition.

RAIL NETWORK

In the event of mobilization, U.S. railroads would carry the major proportion of military cargo to U.S. ports of embarkation for further transport to overseas locations. Historically, railroads have been utilized by defense planners since they and highway networks tend to traverse an east-west orientation useful to meet anticipated contingencies. The inland waterways, for example, typically follow a north-south alignment which limits them to certain areas of the country.

Other advantages tend to favor railroads over other transport modes such as highways. Some of these include: (1) appreciably fewer size and weight limitations on the movement of oversize and overweight cargo such as tanks; (2) port congestion can be controlled by regulating the rate at which trains are released from enroute rail yards; and (3) the capability to move very large quantities of cargo, staged and easily retained in the planned sequence required for efficient ship stowage at the port of embarkation.

During peacetime however, utilization of railroads for defense needs is virtually nonexistent. Defense rail shipments by government bills of lading total less than one percent of the nation's rail shipments. In the event of an emergency, the rail network would primarily serve to meet freight requirements. Passenger movement would be accomplished mainly by air and highway modes.

Within the past several decades, U.S. rail mileage has been decreasing due to many factors some of which include unprofitable routes and bankruptcies (See Table 4).

TABLE 4

US Rail Mileage

Year	Total	Abandoned
1944	227,000	
1955	221,000	6,000
1966	211,000	10,000
1977	191,000	20,000
1988	?	?

This has caused consternation on the part of defense officials regarding the ability of the rail network to be able to support defense requirements in the event of mobilization. Because of this concern, the Secretary of Defense (SECDEF) in 1975 designated MTMC as his representative agency for the development of the Railroads for National Defense (RND) Program. The main objective of the program was to analyze and identify those rail lines that were considered to be important to the national defense effort in times of national crisis.

As a result of these efforts, a Strategic Railroad Corridor Network (STRACNET) was developed. The network consists of about 32,500 miles of mainlines and about 5,000 miles of connector lines between STRACNET and defense installations and activities which require rail service to accomplish their mission (See Figure 5 and Table 5).

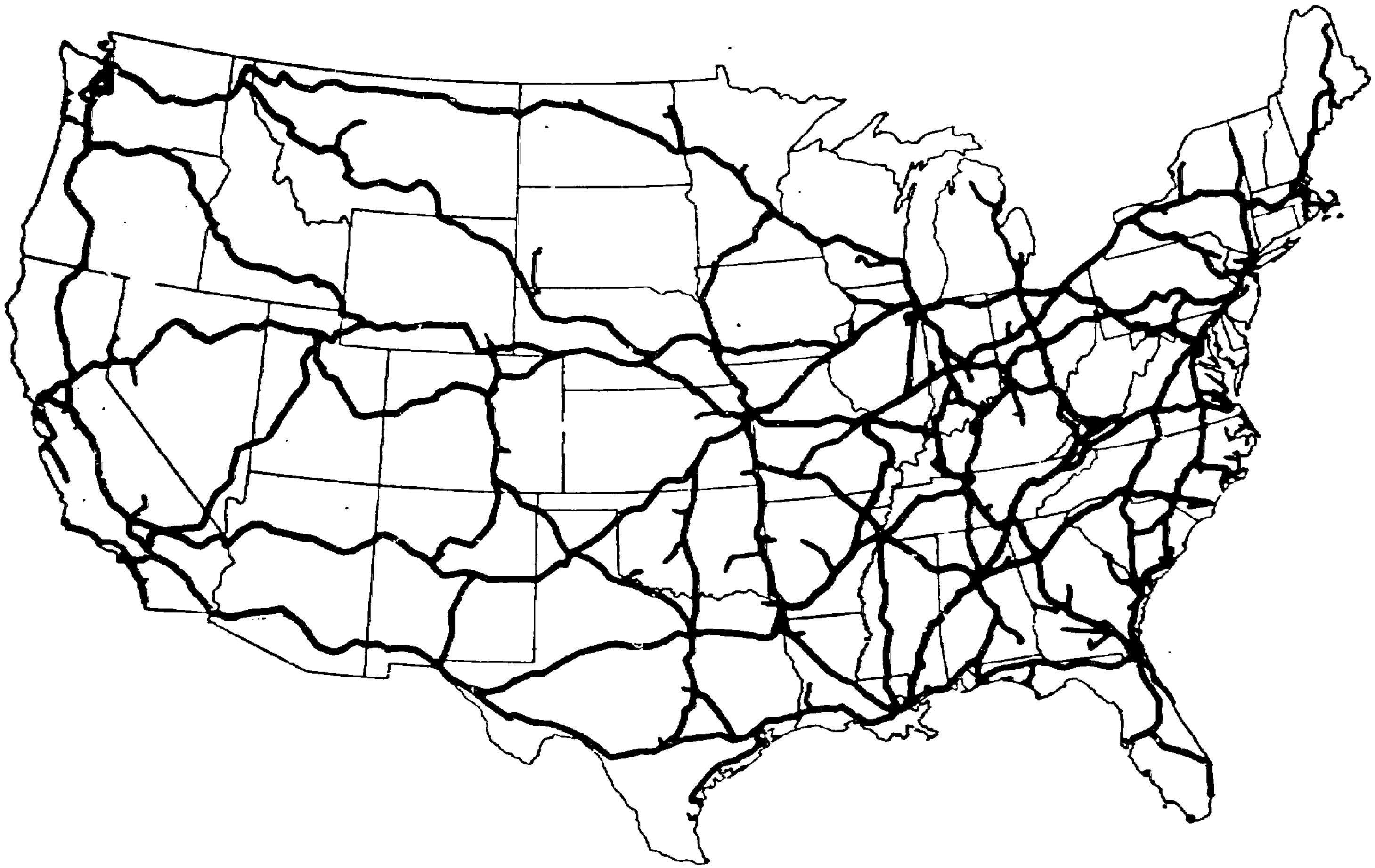
TABLE 5

DOD Installations Requiring Rail Service

Served By	Army	Navy	Marines	Air Force	Defense Logistics Agency	Total
STRACNET	39	11	5	13	8	76
CONNECTORS:						
Mainline	42	6	1	9	7	65
Branchline	27	20	4	17	7	75
TOTAL:	108	37	10	39	22	216

It is important to distinguish the difference between the term corridor and specific route or rail line. The STRACNET concept as developed is composed of corridors or combinations of specific routes. For example, the Chicago to Omaha corridor contains some six lines or routes between these two points. The corridor approach, as opposed to the specific route approach presented defense needs without advocacy of any individual carrier. This approach also gave the planners maximum flexibility in scheduling.

RAIL LINES IMPORTANT TO NATIONAL DEFENSE



LEGEND:

STRACNET

CONNECTORS

Figure 5

Congressional concern about the readiness of the rail network's physical condition and its capability to support the national defense effort in times of crisis culminated in the passage of a statute (Public Law 96-418 dated 10 October 1980). In essence, this law tasked the SECDEF through MTMC to conduct periodic surveys of the condition of STRACNET and report back on the results of those efforts. Basically, the effort had to include: (1) an identification of those segments of the corridor which, as a result of deferred maintenance or deterioration, may potentially have an adverse impact on the movement of personnel, equipment, and materials among Federal military arsenals and installations; and (2) an estimate of the cost of rehabilitating such segments.

The first survey was completed and sent to Congress in June, 1981. Results indicated that the readiness condition of the STRACNET is excellent. Of the 32,500 miles in the mainline, only about 230 miles did not meet readiness conditions established by the report. The remaining survey results are contained in Table 6.

TABLE 6

Readiness Condition - Results

	Unacceptable	Acceptable	Desirable
STRACNET			
Class	I	II	≥III
Miles	233	1,454	30,735
Percent	1%	4%	95%
CONNECTORS			
Class	<I	I	≥II
Miles	-	447	4,587
Percent	-	9%	91%

Based on the results of this report, the SECDEF recommended to Congress that no specific action be taken at this time. Incidentally, in 1980, U.S. railroads invested about 1.3 billion dollars for roadway and structure improvements to improve maintenance conditions. This represented a spending increase of about 5 percent from 1979.

As of 1980, the current inventory of rolling rail stock in the U.S. was about 1.7 million freight cars. This quantity is deemed sufficient to meet defense as well as civilian needs. In addition to this, there is no shortage of locomotives in the U.S. at the present time.

As compared to the decentralized trucking industry, the railroad industry has good centralized control over their assets. All of the major railroads have up-to-date computer systems which can track the location of any car almost instantly. These type of systems, although costly, have enabled the rail industry to keep abreast of their assets and capabilities to meet future requirements.

PIPELINE NETWORK

Pipelines are not normally thought of as being an integral part of the U.S. transportation network. They do however, constitute an important element of the system in regard to the movement of petroleum products. In the event of mobilization, adequate and timely fuel supplies will be paramount to initiate and maintain deployment (both airlift and sealift). Without adequate fuel supplies, strategic mobility is no more than an illusion. Today, pipelines constitute the largest percentage of petroleum transport modes within the U.S. and future trends indicate this percentage will remain the same (See Figure 6 and 7).

Although the first pipelines were built in the 1860s, it was not until World War II that the real extent and capacity of the system

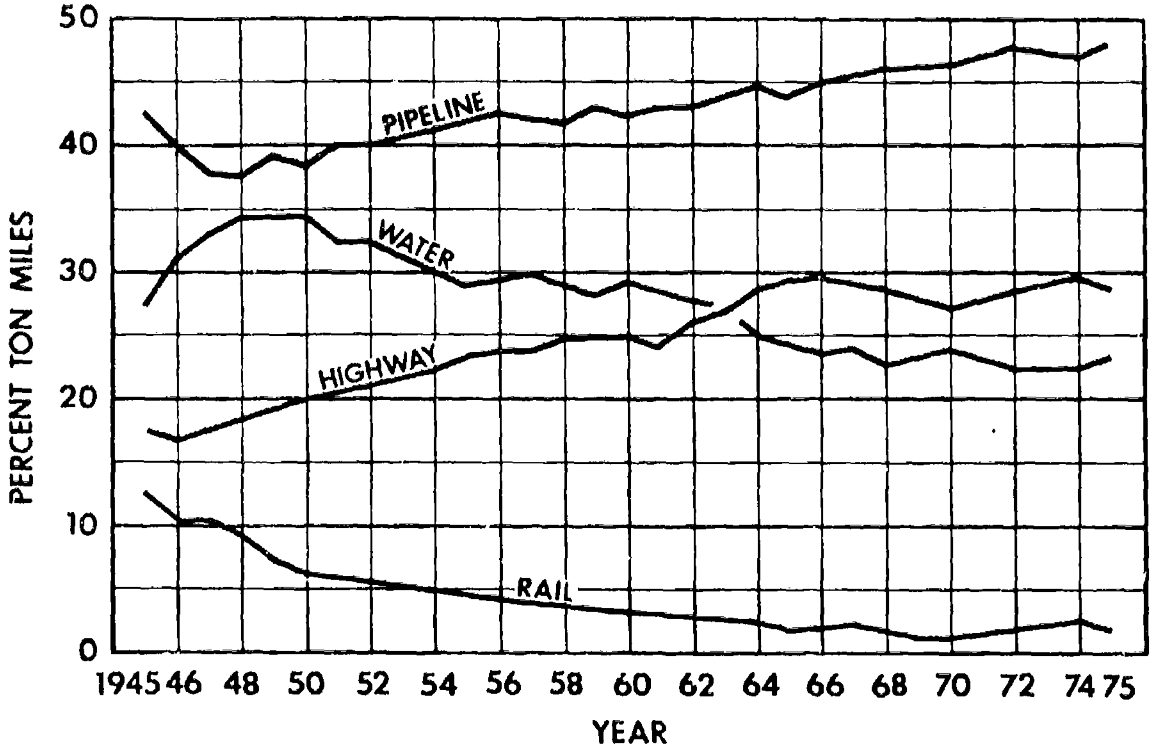


Figure 6. Crude oil and petroleum products transported in the United States, by mode, 1945-1975.

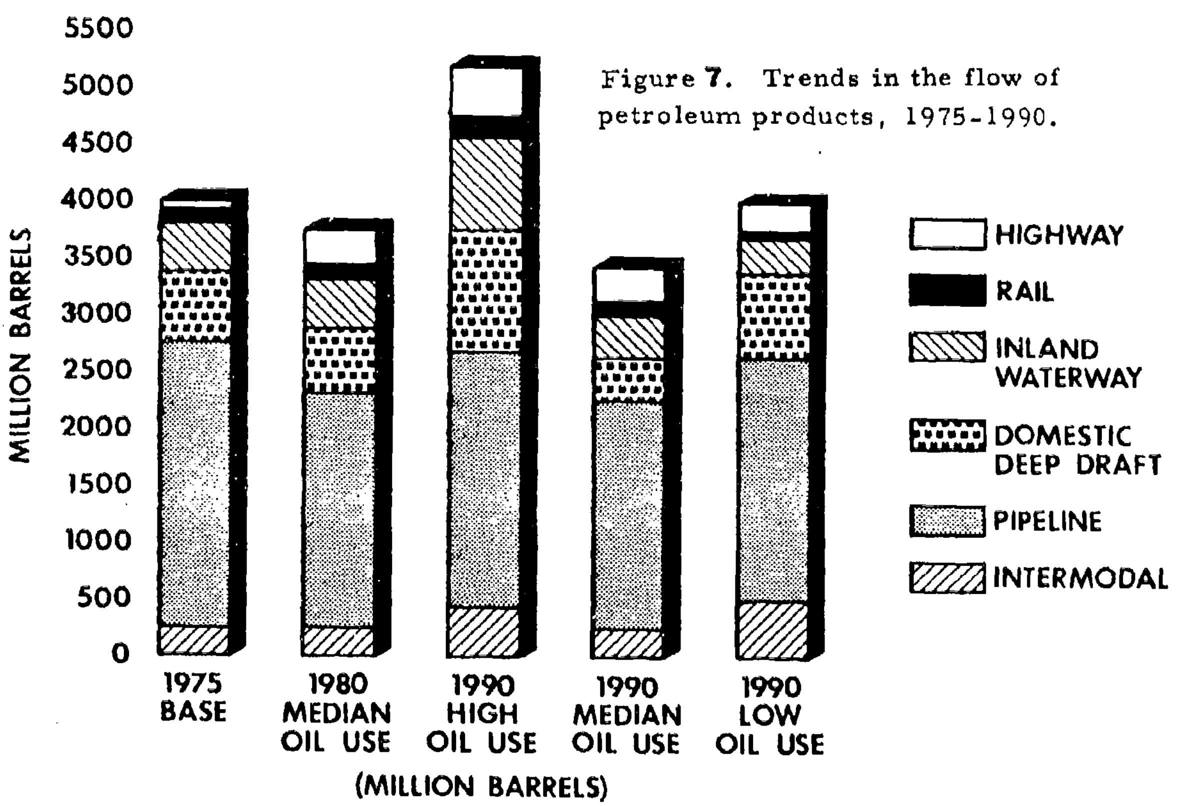


Figure 7. Trends in the flow of petroleum products, 1975-1990.

significantly increased. At the present time, the U.S. pipeline system consists of about 430,000 miles. Of this total, about 170,000 miles consist of liquid pipelines with the remaining 260,000 miles consisting of gas pipelines. Of the 170,000 miles of liquid lines, only about 75,000 miles are considered important to the national defense effort. This is because these lines carry refined petroleum products as opposed to crude petroleum which the military installations cannot utilize. The CONUS military installations with pipeline connections are shown in Table 7 and accompanying Figure 8.

Pipelines have many advantages over competing modes in regard to the transport of petroleum. These include:

1. Typically, pipelines are the most efficient and economical form of land transportation of petroleum products.

2. Product pipelines are normally underground and out of the way.

3. They require no unprofitable return trips as do empty rail tank cars or truck tankers.

4. They offer continuous service, 24 hours per day, 365 days per year.

5. They provide high reliability of operation, as they are unaffected by work stoppages and are impervious to weather.

6. They are, by far, the safest mode of petroleum products transportation and the most compatible with the environment.

7. They reduce the need for rail and truck vehicles to transport POL, thereby freeing those vehicles for other uses.

Although these advantages are numerous and impressive, they also have some serious disadvantages which the logistics planner must consider. These include:

TABLE 7

CO[illegible] INSTALLATIONS WITH PIPELINE CONNECTIONS

Activity

Industry-Owned

1. Andrews AFB, MD
2. Barksdale AFB, LA
3. Beale AFB, CA
4. Bergstrom AFB, TX
5. Blytheville AFB, AR
6. Castle AFB, CA
7. Davis-Monthan AFB, AZ
8. Dyess AFB, TX
9. Edwards AFB, CA
10. El Centro NAS, CA
11. Ellsworth AFB, SD
12. Fairchild AFB, WA
13. Fallon NAS, NV
14. George AFB, CA
15. Griffiss AFB, NY
16. Hill AFB, UT
17. Homestead, FL
18. Key West NAS, FL
19. K. I. Sawyer AFB, MI
20. Kingsville NAS, TX
21. Luke AFB, AZ
22. March AFB, CA
23. Mather AFB, CA
24. Maxwell AFB, AL
25. McChord AFB, WA
26. McClellan AFB, CA
27. McConnell AFB, KS
28. McGuire AFB, NJ
29. Meridian NAS, MS
30. Mountain Home AFB, ID
31. Myrtle Beach AFB, SC
32. Nellis AFB, NV
33. Norton AFB, CA
34. Oceana NAS, VA
35. Offutt AFB, NB
36. Robins AFB, GA
37. Seymour Johnson AFB, NC
38. Tinker AFB, OK
39. Travis AFB, CA
40. Utah ANG, UT
41. Williams AFB, AZ
42. Wright-Patterson AFB, OH
43. Wurtsmith AFB, MI
44. Yuma MCAS, AZ

Activity

Industry-Owned (active, pipeline not in use)

45. Cannon AFB, NM
46. Holloman AFB, NM*
47. Hunter AAF, GA (pipeline removed)
48. Little Rock AFB, AR*
49. Malmstrom AFB, MT
50. Miramar NAS, CA*
51. Rickenbacker AFB, OH
52. Sheppard AFB, TX

Industry-Owned (inactive installations)

53. Amarillo AFB, FL
54. Biggs AFB, TX
55. Geiger Field, WA
56. Kincheloe AFB, MI
57. Larson AFB, WA
58. Lincoln AFB, NE
59. McCoy AFB, FL
60. Otis AFB, MA
61. Shilling AFB, KS
62. Walker AFB, NM
63. Webb AFB, TX
64. Westover AFB, MA

Military Service Contract

65. Dover AFB, DE
66. Grand Forks AFB, ND
67. Pease AFB, NH
68. Plattsburgh AFB, NY

Government-Owned

69. Charleston AFB, SC
70. Chase Field NAS, TX
71. Corpus Christi NAS, TX
72. Dow AFB, ME (inactive installation)
73. El Toro MCAS, CA
74. LeMoore NAS, CA
75. Long Beach NSC, CA
76. Loring AFB, ME
77. MacDill AFB, FL
78. Norfolk NB, VA
79. North Island NAS, CA
80. San Diego NSC, CA

*Pipeline service has recently been reinstated to these installations.

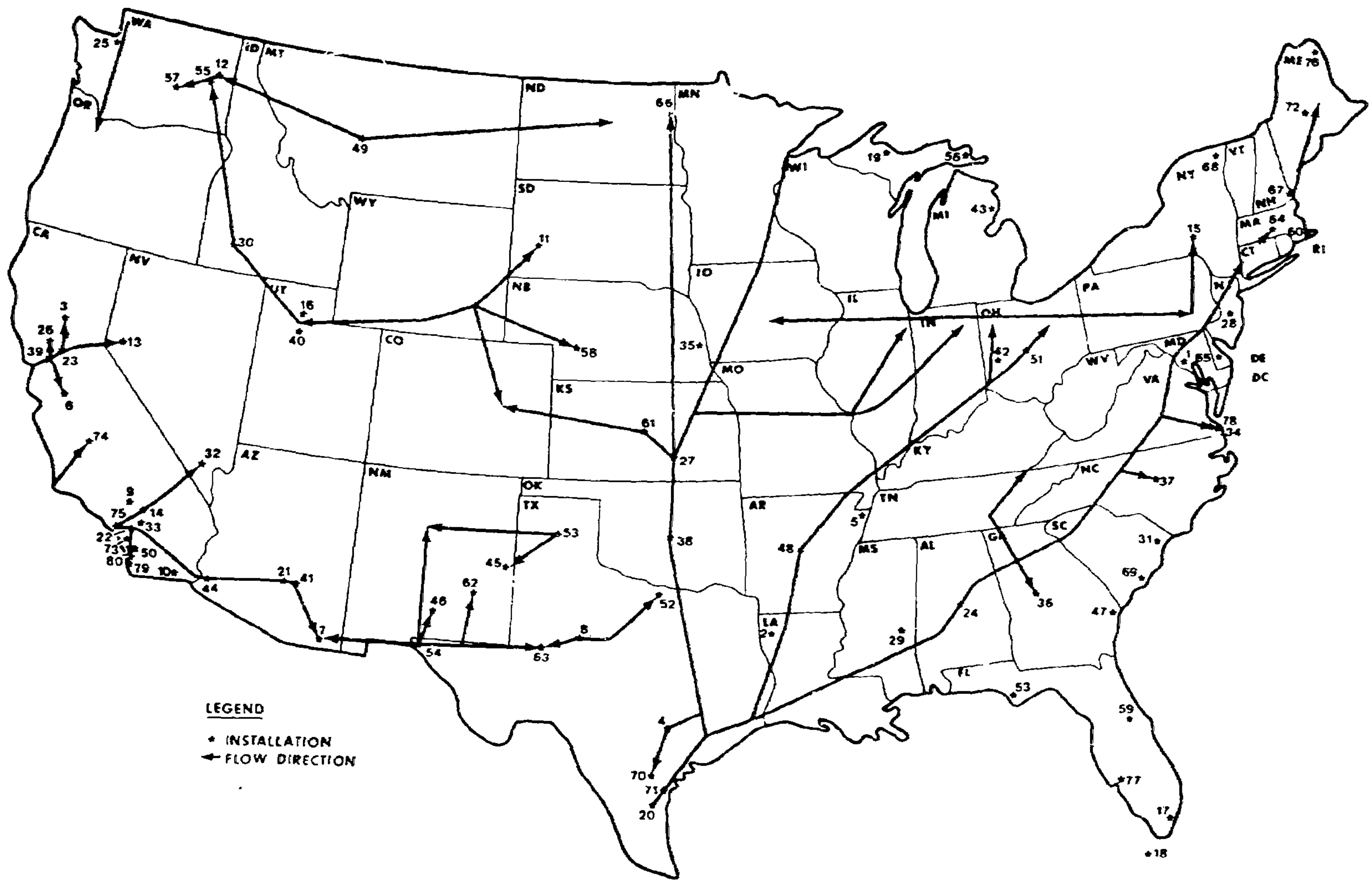


Figure 8. Product pipeline strategic network.

1. Pipelines (like rail and highway) and related operational facilities are subject to sabotage. In pipeline systems, particularly vulnerable are refineries, pumping and input stations, line intersections, river crossings, and computerized control systems. If threat of sabotage is imminent, truck transport is the most flexible transport mode for limited quantities.

2. Once in place, the pipeline route is fixed; it cannot be readily adjusted to serve shifting sources of supply or changing markets.

3. Pipelines are very costly to construct, with costs varying from \$50,000 to \$800,000 per mile.

4. Pipelines are a risky, competitive venture. A pipeline company must forecast probable volume of future oil movements in order to predict its revenue, but has no guarantee that the source will remain productive or that the demand will remain profitable.

5. Common carrier pipelines face strong competition in the marketplace; shippers can withdraw their business and shift to another line or mode anytime a more attractive tariff rate is available.

6. Pipelines are less effective than trucks in handling low-volume movement and short-haul distribution of products from terminal to bulk plants or local outlets, except where pipeline service exists nearby or where pipeline spurs may be added.

Perhaps the largest disadvantage is their vulnerability to sabotage. Such installations as pump stations, river crossings and exposed pipeline sections make easy and lucrative targets of saboteurs. If any of these facilities were damaged, repair efforts would be lengthy and fuel movement would be curtailed during this time.

Since many refineries and pipeline terminals are concentrated in small areas, they afford a choice target for nuclear attack. For example, a low yield nuclear weapon exploded at Houston, Texas could eliminate a major pipeline transport system at its source. Similar strikes in other areas could virtually dry up the nation's fuel supply in short time.

Because the transport of fuel by pipelines is a highly competitive venture, many pipelines are kept under continuous monitoring with numerous detection and data reporting devices. Such indicators as drops in pressure, temperature changes and viscosity changes trigger alarms isolating problem areas for rapid determination and repair.

At the present time, no formal contingency or emergency plans exist for priority use of the CONUS pipeline system. The Defense Fuel Supply Center (DFSC) does however maintain an emergency distribution plan for delivery of fuels from Defense Fuel Support Points to DOD activities. Another action which could be initiated to alleviate this shortcoming is to include representatives from the pipeline industry on the MTMC's Contingency Response (CORE) program to help develop and provide rapid reaction procedures in order to insure DOD priority for pipeline service prior to and during contingencies and mobilization.

Additionally, no single source document currently exists which identifies the capabilities and characteristics of those pipelines that are important to the national defense effort. Attempts are being made by such organizations as MTMC to identify a strategic pipeline network which would incorporate capabilities and capacities into a single document.

As with the other modes, prudent judgment dictates that strategic planners should not rely on individual modes to accomplish the entirety of specific requirements. Since pipelines are highly susceptible to severe and lengthy disruptions caused by sabotage, other modes of transportation such as truck and rail have to be integrated into the system even though this adds redundancy. This redundancy however, should not be sacrificed in the name of economy for in the event of a crisis, these alternate modes would have to be called upon to deliver the petroleum products.

The discussion so far has concentrated on CONUS transportation assets to include rail, highway, inland waterways and pipelines. There is a remaining element to the total transportation network and that is the airlift and sealift components from CONUS to overseas locations. Ultimately, these two modes will provide the U.S. with power projection and strategic mobility in any future conflict. Each component will be discussed separately highlighting their capabilities and limitations.

AIRLIFT

No matter where the next conflict occurs which involves U.S. forces, one thing is virtually certain--the forces and supporting equipment will be required to be deployed rapidly. Only one transport mode can accomplish this task and that is airlift.

At the present time, U.S. airlift assets are composed of two sources: (1) Military Airlift Command (MAC); and (2) the Civil Reserve Air Fleet (CRAF). Each component would provide about one-half of total requirements during a crisis. Current assets for each component are listed in Table 8. Many of the aircraft listed in Table 8 are capable of hauling all types of cargo but only one can haul oversize cargo (M-1 tank) and that is the C-5A. No known CRAF aircraft could come close to hauling oversize cargo since they are not adapted for this.

TABLE 8

Airlift Capability

— Military Airlift Command(MAC) Assets(Provides about ½ of total capability)

77 - C-5A's(each with a 50 ton lift capacity)
270 - C-141's(each with a 20 ton lift capacity)
234 - C-130's
300 - C-130's(Reserve)

— Civil Reserve Air Fleet(CRAF) Assets(Provides about ½ of total capability)

Type Aircraft	Passenger	Cargo	Total
B-747	113	36	149
DC-8	0	51	51
DC-10	60	18	78
B-707	46	6	52
L-1011	12	0	12
Totals:	231	111	342

In any compressed conflict (less than 2 months) and of considerable magnitude, cargo hauling capability by airlift would be insufficient and would not be able to meet the heavy demands imposed upon it without sealift backup. For example, to airlift a light division from CONUS to Europe would require about 1200 sorties consisting of 100 C-5A's and 1100 C-141's. To lift a mechanized division would require about 1600 sorties consisting of 400 C-5A's and 1200 C-141's.

In order to strengthen airlift capability, the Military Airlift Command has initiated two programs in order to increase existing capacity. One program is the C-5A wing modification which is scheduled to be completed in 1987 and will provide an additional 30,000 hours of flying time to each aircraft. In addition to this, the modification will also add cargo handling capacity since at the present time each C-5A is only capable of hauling one M-1 tank. With the modification, two tanks will be able to be hauled. About 77 C-5A's are scheduled to be included in this program.

The other program is the C-141 "stretch" modification effort. This change will increase cargo handling capacity on each aircraft by 30 percent and add air refueling capability which would increase range. The program is scheduled to be completed in 1984 and already about 100 aircraft have been modified.

Recently, Congress opted to acquire additional C-5N's in lieu of the versatile C-17 in order to increase cargo handling capacity. No matter which aircraft ultimately gets added to the inventory, the end result will be a significant increase in cargo hauling capability which will add to the total strategic mobility effort.

The other airlift source is the Civil Reserve Air Fleet. This source would constitute a major airlift asset during mobilization. It is a program designed to identify and contract industry assets in peacetime and use them during wartime. Although the program has been in effect for about 30 years, it has never been formally activated. It was utilized during several conflicts such as Vietnam but on a limited basis.

The CRAF program provides a wide range of options for call-up based on the nature of the contingency. As in many other mobilization actions, the program is divided into three stages of participation depending on the seriousness of the situation. Stage I (Committed Expansion) can be activated by the Commander of MAC. This would provide about 50 aircraft to MAC within 24 hours. Stage II (Airlift Emergency) would be activated by the SECDEF and would provide about 130 aircraft to MAC within 24 hours. Stage III (National Emergency) can only be activated by the President and would assign the entire CRAF fleet to MAC within 48 hours. This stage is designed for full mobilization and constitutes 50% of DOD's strategic airlift capability.

None of CRAF's assets are capable of hauling oversize cargo and many of their aircraft are severely limited in loading other types of military cargo. In an attempt to alleviate this situation, a CRAF enhancement program was proposed which would have added nose visor or side-loading cargo access doors in addition to a strengthened floor to accommodate the heavier military cargo. It was scheduled to be completed in 1987 and would've applied to about 70 aircraft. Recently however, Congress withheld funds for the program due to increased costs.

Passenger airlift requirements could be met with current available assets but cargo airlift capability would be another matter. Regardless of the scenario, the CRAF in its present configuration offers sufficient capability to satisfy DOD passenger airlift requirements. In the area of cargo airlift however, the combined total of strategic military and commercial cargo airlift is about 50 to 150 C-5 equivalents short of requirements.

Another problem currently being worked on is the unique materials handling equipment necessary to fully utilize the commercial cargo aircraft. Cargo must be elevated 16 feet to reach the upper deck of a B-747 freighter. This height is beyond the capability of the Air Force's standard 20,000 and 40,000 pound pallet loaders located at major military ports throughout the world. In order to solve this problem, MAC is leasing special loading equipment for commercial wide-body aircraft and positioning it at primary CONUS and overseas ports. A factor often overlooked is that MAC aircraft will start to deteriorate after their initial usage (about 15 to 18 days). This occurs since spare parts and maintenance on the aircraft will become limiting due to increased demand which in turn may ground some of the airlift effort.

SEALIFT

In any future crisis, about 95 percent of the cargo to support our forces in overseas areas will be carried by sealift. At the present time, the U.S. has adequate capacity to deliver personnel to these locations by airlift assets but the same cannot be said about sustaining these forces for any protracted length of time. When analyzing sealift capability, it is helpful to delineate its composition.

Basically, it consists of five elements: (1) Military Sealift Command (MSC) Controlled Fleet Assets; (2) Ready Reserve Fleet (RRF); (3) National Defense Reserve Fleet (NDRF); (4) U.S. Flag Merchant Fleet; and the (5) Effective U.S. Control Fleet (EUSC). If the conflict consisted of a NATO-Warsaw Pact matchup, another element might be added to the above five and that is the NATO Flag Merchant Fleet. Table 9 lists currents assets of each of these elements.

TABLE 9

Sealift Capability(Listed in Order of Dependability)

—Military Sealift Command(MSC) Controlled Fleet Assets

78 ships(6 govt.-owned and 25 chartered U.S. flag ships can handle cargo)*

—Ready Reserve Fleet(RRF)(Part of National Defense Reserve Fleet)

30 ships(can be ready within 10 days)

—National Defense Reserve Fleet(NDRF)(Known as Moth-ball fleet)

300 ships(of which only about 100 are useable)**

—U.S.-Flag Merchant Fleet(Activated by Sealift Readiness Program)

300 ships(about 100 are container ships)

—Effective U.S. Control Fleet(EUSC)(basically U.S.-owned ships operating under foreign flags)

400 ships

—NATO-Flag ships(only available in a NATO conflict)

600 ships

Notes: * - Eight SL-7's will be added to MSC inventory.

** - It would take a minimum of 60 days to get these ready.

When reviewing Table 9, the reader should bear in mind the dependability/reliability of each element. Although the number of assets appears large, their reliability in times of crisis is questionable.

In examining the literature, evidence indicates that many mobility plans are based on the "best case" situation making them excessively optimistic. For example, the benefit from the U.S.-Flag Fleet may be overestimated because not all ships are suitable for military use. Diverting what few U.S.-flag ships we have to military use also would create severe gaps in our ability to keep critical goods flowing to the United States. The NDRF directly reflects the decline in the U.S. Merchant Marine. Going from 2,000 ships in 1960 to 1,027 ships in 1970, the NDRF was down to 317 ships in 1979 and is below that figure today. Most of the remaining vessels are WW II "Victory" ships. Reliance on the so-called "effective U.S.-Controlled Fleet" should be tempered with caution. Navy sources indicate that few of these ships are suitable for military sealift and control may be more perceived than actual, based on problems encountered in getting their assistance in Vietnam and during the 1973 war in the Middle East. The Allied shipping chip may only be played in the NATO scenario and it also has a potential for problems. Only five of 16 NATO countries have the power to take over private shipping prior to the outbreak of hostilities and many of the promised ships are under flags of convenience with the same attendant problems as our "EUSC" Fleet.

In the non-NATO scenario we lose the Allied shipping pledges leaving us short on capacity. In the NATO scenario we have the extra ships but also are faced with a Soviet Navy which presents us with a new dimension to the shipping problem — that of protection. As previously mentioned much of the planning has been predicated on the "best case." The USSR has seven times the submarines Germany had at the beginning of WW II. The U.S. Navy protection assets have declined to the point that the remaining escort vessels in the active forces may be needed for the 15 battle groups leaving only a few Reserve and Allied ships for convoy escort. The second area of protection for shipping which is lacking is in mine sweeping capability. The U.S. Navy presently has only a handful of mine sweepers in its inventory.

While reliability remains an unknown issue, the two major problem areas facing strategic sealift capability are the state of the U.S. shipbuilding industry (following discussion) and the operation of the U.S. Merchant Marine. A quick glance at Table 9 indicates that in the event of mobilization, most of the U.S. assets are contained in the U.S. Merchant Fleet. U.S. merchant shipping has been on the decline for the past decade. This decline can largely be attributed to the lack of ship replacement by shipowners. The reasons are basically economic. The high cost of labor and materials to build a ship in U.S. shipyards results in it costing about twice as much as it does in many foreign yards. This unfavorable cost ratio also applies to the high cost of operation by U.S. crews again resulting in many U.S. Flag ships being operated by foreign crews. The U.S. Congress has been making some strides in this area in the form of subsidies, etc. but headway has been slow indeed.

In any discussion regarding strategic mobility, the sealift component sometimes is alluded to as the "achilles heel" in the total transportation network. In a one war theater (NATO-Warsaw Pact), it is possible that sealift might support the incredible demand for resupply estimated at about 2 1/2 million short tons during the first thirty days, providing that the conflict becomes protracted. This of course assumes a "best case" situation. However, if the scenario expands to a 1 1/2 or two war theater, sealift capability would be inadequate especially if the conflict is compressed into a short time span.

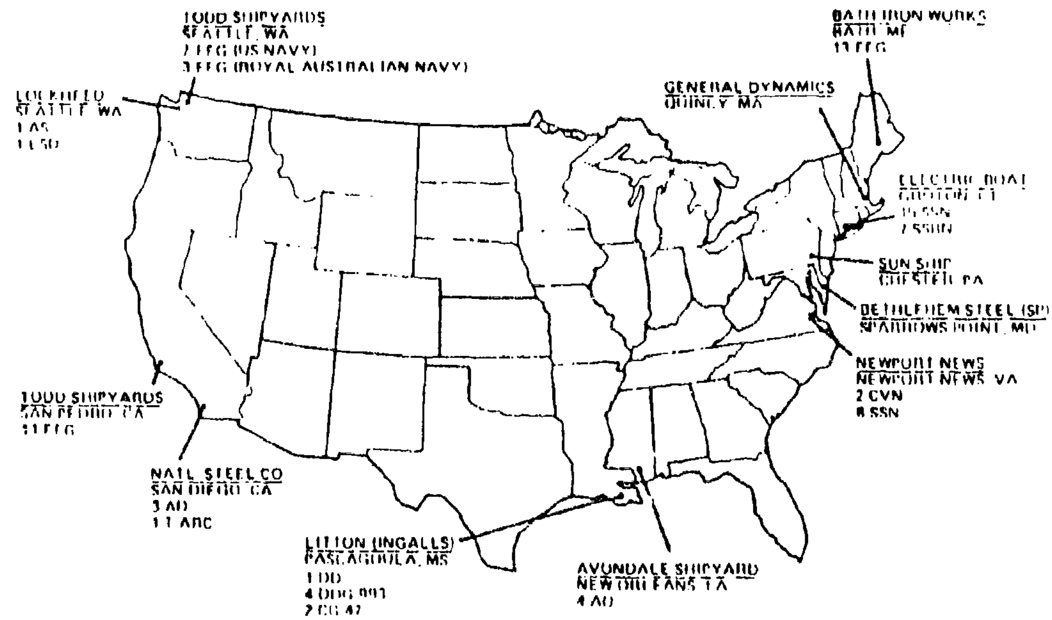
THE SHIPBUILDING INDUSTRY

Sealift capability in times of crisis consists on two sources: (1) ships available in the inventory; and (2) ships which can be produced by our nation's shipbuilding industry. Over the last two decades, however, this industry has been on the decline. Several reasons exist for this decline, the two most noteworthy being that: (1) the worldwide demand for ships has dropped since the mid 1970s; and (2) ships built in U.S. yards are not competitive with other nation's shipyards. In regard to the latter reason, several factors can be attributed. These include low labor productivity, low profit margins, heavy reliance on foreign producers for parts, government business and regulations, and contracting arrangements and attitudes.

Because of the worldwide decline in demand for ships, U.S. shipyards have had to form conglomerates to remain afloat. In fact, only one major U.S. shipbuilding company (Todd) remains independent (see Figure 9). The industry is characterized by low labor productivity. It is also one of the most labor intensive of all industries, with overall labor costs representing a disproportionately high share of total product cost. Factors contributing to low productivity include lack of automation, limited working space, lack of standardization in ship design, limited yard space, and very large fluctuations in workload and employment leading to rapid worker turnover (about 25% per year) and low average employee experience level.

FIGURE 9

MAJOR PRIVATE SHIPYARDS AND CURRENT CONSTRUCTION ASSIGNMENTS



The industry has come to rely heavily on foreign suppliers for most large castings and forgings due to shorter lead times in delivery, lower prices, and better reliability. Since the industry is almost totally non-competitive in the international market (without U.S. subsidy), all of its business in one way or another is connected with the U.S. government (the major exception being emergency repairs performed on foreign vessels). About one-third of the government work is done for the U.S. Coast Guard with the remaining two-thirds being performed for the U.S. Navy.

Since the industry has become so heavily dependent on government work for its existence, the government has promulgated a myriad of regulatory requirements which has resulted in higher costs. Several studies by the industry have indicated that between 10% and 20% of the cost of a ship has nothing to do with production costs, but is directly related to satisfying government regulatory requirements.

In any future conflict, the importance of the U.S. merchant fleet will be paramount. Yet, as mentioned earlier, very few merchant ships are now being built in U.S. yards. Over the last decade, only slightly more than 2% of the world's total merchant ships were built in this country (See Table 10).

TABLE 10

Share of Oceangoing Merchant Ships Delivered by the Principal World Shipbuilding Countries

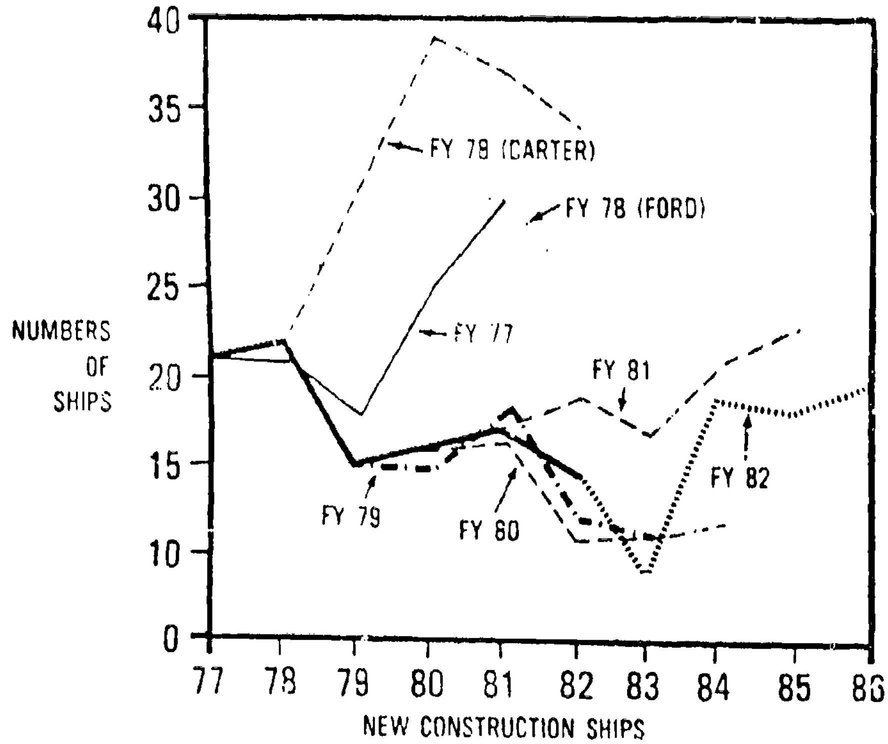
Shipbuilding country	Percent share by year											
	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
United Kingdom	7.8	6.2	4.4	6.3	5.1	4.5	3.5	3.6	3.4	4.4	3.7	6.2
Denmark	2.6	3.1	3.2	2.5	3.0	3.6	3.3	3.2	2.8	3.0	2.6	1.9
France	2.7	3.7	3.7	3.6	4.5	3.9	3.8	3.1	3.4	4.9	4.0	2.4
East Germany	1.8	1.8	1.7	1.6	1.2	1.2	1.0	1.0	1.0	1.0	1.4	2.3
West Germany	6.9	7.2	9.5	6.2	8.1	5.2	6.3	6.4	7.3	5.5	5.8	4.6
Italy	3.3	3.0	1.9	2.6	3.6	3.4	2.8	2.8	2.3	2.1	2.8	1.9
Japan	47.6	49.6	48.9	48.1	45.6	48.1	48.5	50.4	49.[illegible]	46.8	42.5	34.7
Netherlands	1.9	1.6	2.6	3.0	2.3	2.8	2.8	2.8	3.0	1.9	0.8	1.[illegible]
Norway	3.5	3.[illegible]	3.3	3.3	3.6	3.1	3.2	2.9	3.1	2.2	2.1	1.8
Poland	2.5	2.[illegible]	2.3	2.0	1.9	2.0	1.9	1.5	2.1	1.7	1.7	3.7
Spain	2.3	2.2	3.4	3.1	3.4	4.0	4.3	4.7	4.7	3.9	6.6	4.5
Sweden	9.0	6.5	6.7	7.3	7.6	7.6	7.5	6.5	6.4	7.4	8.4	7.7
United States	1.4	2.1	2.5	1.8	2.0	1.8	3.1	2.2	1.4	2.4	3.6	5.7
Yugoslavia	1.7	1.9	1.6	1.8	1.6	2.5	1.5	2.1	1.9	1.8	1.5	1.6
	Gross Tonnage (millions of tons)											
World totals	15.2	16.8	18.7	21.0	24.4	26.7	30.4	33.4	34.2	33.9	27.5	

Note: Gross tonnage figures exclude USSR and Romania (Prior to 1970) and People's Republic of China (Prior to 1977)

As in any industry, a cylical and unpredictable workload can play havoc on productivity and output. This industry, mainly because of its heavy dependence on government work has been particulary hard hit by these fluctuations. Figure 10 illustrates this variance for the period from FY 77 to FY 86. No organization can tolerate this uncertainty for very long without suffering serious consequences. Coupled with this fluctuating workload is the fact that since shipbuilding funds are appropriated yearly, both the Administration and Congress are provided with

FIVE YEAR PLANS

Figure 10



an annual opportunity to change positions on future programs. Because of these factors, a typical time span of about nine years separates the realized requirement for a new navy ship and its readiness for fleet use.

As might be expected from the above discussion, mobilization and surge capability within the U.S. shipbuilding industry at the present time is negligible. It is unlikely, for example, that a single extra ship could be produced within two years (although some ships under construction might be accelerated slightly to fall within a two year time frame). The primary reason, quite simply, is that it takes more than three years to construct a ship - and that is assuming that everything, including material and skilled labor is on hand when needed.

If current trends continue, the situation will worsen rather than improve. The supply of skilled labor is uncertain; the supply base is dwindling; shipyards are going out of business (e.g., Sun Ships no longer accepts new construction contracts); and the Navy, legislated out of the construction business, is losing its expertise in ship design and construction.

In an effort to remedy some of the above listed symptoms plaguing the industry, the U.S. must consider the following options: (1) a firm and predictable shipbuilding program to insure a steady flow of business; (2) institution of incentives to attract and encourage U.S. shippers to buy their ships from U.S. yards; (3) changes in funding practices; and (4) overhaul of government regulatory requirements and contracting procedures.

TRANSPORTATION MANAGEMENT

Effective strategic mobility consists of two factors: (1) physical assets which have already been discussed; and (2) management of those assets. The current management scheme of DOD transportation resources is divided into the three services single manager transportation operating agencies (TOA's): (1) The Army's Military Traffic Management Command (MTMC) which manages military traffic and land transportation in CONUS and common-user ocean terminals within CONUS and overseas; (2) the Navy's Military Sealift Command (MSC) which operates and manages common-user ocean shipping; and (3) The Air Force's Military Airlift Command (MAC) which provides for the worldwide operation of common-user airlift resources and aerial ports.

These three agencies are responsive to tasks assigned by the Joint Chiefs of Staff (JCS) during times of crisis or war. Each TOA provides information and assistance within their respective resources and capabilities to enable the JCS to fulfill their movement responsibilities and to act effectively by providing an interface between the services and the TOA's.

Each TOA has definite strategic mobility planning responsibilities in support of operational planning development. They are:

1. MAC schedules and analyzes the intertheater airlift segment. The analysis includes an assessment of the adequacy of throughput capabilities of aerial ports of embarkation (APOEs), both in CONUS and in the theater.

2. MSC schedules sealift and coordinates port services (tugs, barges, etc.) in support of operations with appropriate port authorities at both the seaports of embarkation (SPOEs) and seaports of debarkation.

3. MTMC plans the CONUS movement of forces and supplies to mobilization stations, depots, and APOEs and through the SPOEs.

The management of these TOA's is a complex task during peacetime. During a crisis situation however, the management effort would be made more difficult due to the increased demand for limited resources coupled with the added factor of compressed time schedules.

Integrating all of these assets into a unified strategic mobility effort is an even more complex task than managing each separate TOA. The coordination, scheduling, capabilities, and requirements of the various modes would pose a burden of incredible magnitude on any manager responsible for this effort. Figure 11 illustrates a conceptual activation sequence of the various lift options that would have to be managed depending on the scope of the tensions and the time dimensions of the conflict.

It might seem plausible that to effectively coordinate and manage such a system of enormous diversity and incredible complexity, DOD would have integrated these diverse functions into some form of centralized

LIFT IMPROVEMENT OPTIONS ANTICIPATED ACTIVATION SEQUENCE

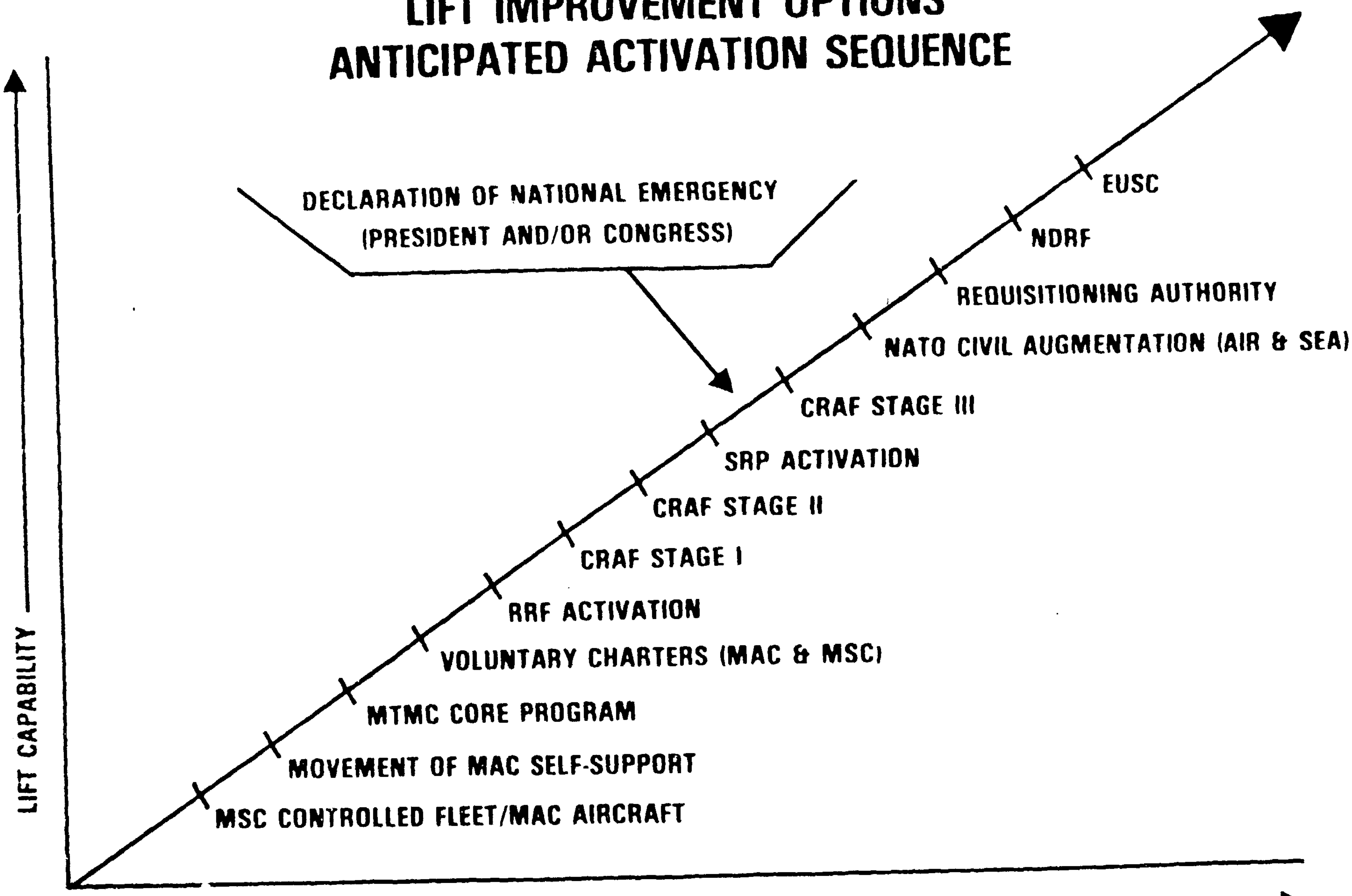


Figure 11

control. There have been numerous attempts at this sort of integration in the past and since World War II, the following efforts were directed toward this goal:

1944-House Select Committee recommends centralized defense traffic management.

1947-National Security Act of 1947 directs SECDEF to take necessary action to eliminate unnecessary duplication in the field of transportation.

1949-The First Hoover Commission advocates centralized control of the transportation resources of the government.

1953-The Second Hoover Commission recommends strengthened central direction in traffic management.

1956-SECDEF designates Secretary of the Army as single manager for all military traffic in CONUS.

1961-Secretary of Army given broader responsibility to include land transportation and common-user ocean terminals.

1966-SECDEF establishes Office of the Special Assistant for Strategic Mobility.

1970-Blue Ribbon Defense Panel recommends creation of a Unified Logistics Command.

1975-Senate Committee on Appropriations directs DOD to submit report on management of transportation in DOD.

1982-MSC and MTMC to consolidate into one agency.

Arguments can be presented to support or attack the goal of management integration. The pros and cons will not be discussed here but several points are worthy of mention as this goal of integration most likely will be proposed again.

Perhaps the three most important ones are: (1) increased emphasis on intermodal systems; (2) limited transportation assets; and (3) rapid response times. Virtually every strategic mobility movement involves at least two of the transportation modes, and at times all of them. If intermodal shipments are to be effectively managed, greater transfer of information and data between the modes is necessary. Cargo control and in-transit visibility demand accurate, responsive information availability. When cargo moves intermodally, it is common for this information system to break down and for visibility and accountability of consignments to be impaired. In those cases where cargo moves from origins within the CONUS to overseas destinations, and part of the movement is by commercial and part by military means, the paperwork problem is severe, and at times ". . . borders on the chaotic." This unfortunate condition leads to lost cargo, ineffective use of available transportation resources, and consequently, a degradation in overall military capability.

In the event of a crisis, the already limited resources of the various modes will become strained even further. Competition for these scarce resources to achieve requirements will be fierce and effective management will have to be present, otherwise mobility will suffer.

Exacerbating the problem of limited resources is the problem of rapid response times. It is virtually conceded that the next conflict will not be a protracted one like World War II or Vietnam. Demands for personnel and cargo will be massive and rapid, allowing for very little margin of error.

The total U.S. transportation network and its ability to respond to a crisis as it is now structured, cannot be called an example of a "model management system". Several reasons are given to support such a statement. There are a great number of agencies involved in the effort of managing these resources ranging from the Federal Emergency Management Agency (FEMA) down to the individual TOA's in each military service. Since such a large number is involved performing similar functions, redundancy and duplication of effort have occured. Additionally, a large number of agencies participating in similar functions have limited the scope of their responsibilities.

Whether a single manager concept such as a Unified Transportation Command would solve or alleviate some of the current management problems within the transportation network remains to be seen. Certainly, it would help to reduce duplicative activity, particularly in regard to ADP and planning functions, eliminate redundant support functions and might resolve conflicting policy objectives. These functions though are largely administrative in nature and the real test would come in implementing the system in times of crisis. The most recent attempt at consolidation involves the merger of MTMC and MSC. This integration is scheduled for the fall of 1982, and will provide a good test bed for those critics and proponents of a centralized transportation management system.

CONCLUDING THOUGHTS

From the preceding discussion, it appears that most of the physical assets are either available or are being developed to support a one war scenario. It is generally conceded that shortfalls exist in sealift and airlift cargo capability particularly if a future conflict is: (1) protracted or (2) spreads to more than one theater. There are no "quick fixes" to remedy these shortfalls but revitalization of the U.S. shipbuilding industry would certainly go a long way to alleviating the sealift shortfall. Prepositioning also helps in overcoming initial shortages but cannot be relied upon for providing sustainability in a protracted conflict.

Other than the nation's trucking industry and its decentralized management structure, the remainder of the CONUS transportation network is in adequate condition to support a mobilization. Even in the trucking industry, the problems are not insurmountable and attempts are underway to improve the situation.

If an area of doubt exists regarding the nation's ability to mobilize the transportation network, it would have to be in the area of resource management. A large number of agencies coupled with agency parachialism has produced an environment conducive to redundancy and duplicative effort. Whether such a system would function in the heat and confusion of a crisis is questionable and any attempt to provide answers would be merely conjecture.

Attempts to provide this sort of collective management during a crisis are currently being made by such agencies as the U.S. Army's MTMC through its implementation of the Contingency Response (CORE) Program. This program basically insures that DOD receives priority commercial transportation services during contingencies prior to a declaration of a national emergency and during mobilization. The action arm of the CORE team includes members from about twenty private and governmental agencies. Included are Federal Emergency Management Agency, the Association of American Railroads and the American Trucking Associations, Inc.

As mentioned previously, a significant intangible is the strength of U.S. resolve in any future conflict. The best network with the finest management structure coupled with adequate physical assets may not be effective in achieving strategic mobility if the will of the U.S. populace fails to support the effort. Conversely, a weaker network with marginal management might perform in an exemplary manner if the will of people are fully supportive of the effort.

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